(2M x 4 = 8M)

Question: Which of the following statements is incorrect?

a) Both electronic and electrolytic conductance varies similarly with temperature

b) Both electronic and electrolytic conductance depends on the nature of conducting material

c) Electronic conductance is independent but electrolytic conductance depends on the amount of the conducting substance

d) All the above statements are incorrect

Question: Electrolysis of fused NaCl will give

a) Na

b) NaClO

c) NaOH

d) None of these

10. The gas X at 1 atm is bubbled through a solution containing a mixture of 1 M Y^- and 1 M Z^- at 25°C. If the order of reduction potential is Z < Y > X, then

(a) Y will oxidize X and not Z

(b) Y will oxidize Z and not X

(c) Y will oxidize both X and Z

(d) Y will reduce both X and Z

Consider the following cell reaction:

$2Fe_{(s)} + O_{2(g)} + 4H^{+}_{(aq)} \rightarrow 2Fe^{2+}_{(aq)} + 2H_2O(l)$; $E^\circ = 1.67$ V

At $[Fe^{2+}] = 10^{-3}$ M, $P(O_2) = 0.1$ atm and pH = 3, the cell potential at 25°C is **[IIT JEE 2011]**

A 1.47 V

B 1.77 V

C 1.87 V

D 1.57 V

(2M)

Question 48.

Silver is uniformly electro-deposited on a metallic vessel of surface area of 900 cm^2 by passing a current of 0.5 ampere for 2 hours. Calculate the thickness of silver deposited.

[Given: the density of silver is 10.5 g cm^{-3} and atomic mass of Ag = 108 amu.] (Comptt. All India 2013)

(1+2=3M)

Question 42.

(a) How many coulombs are required to reduce 1 mole $Cr_2O_7^{2-}$ to Cr^{3+}? (1M)

(b) The conductivity of 0.001 M acetic acid is 4×10^{-5} S/m. Calculate the dissociation constant of acetic acid if Λ_m^0, for acetic acid is 390 S cm^2 mol^{-1}. (Comptt. All India 2012) (2M)

$(1.5\,M \times 2) = 3M$

Question 26.

(a) Following reactions occur at cathode during the electrolysis of aqueous silver chloride solution :

$Ag^+(aq) + e^- \rightarrow Ag(s)$ $E^\circ = +0.80$ V

$H^+(aq) + e^- \rightarrow \frac{1}{2}H_2(g)$ $E^\circ = 0.00$ V

On the basis of their standard reduction electrode potential (E°) values, which reaction is feasible at the cathode and why?

(b) Define limiting molar conductivity. Why conductivity of an electrolyte solution decreases with the decrease in concentration? (Delhi 2015)

(2 M)

= -212300 J mol^{-1} = -212.3 KJ mol^{-1}

Question 18.

The conductivity of 0.001 M acetic acid is 4×10^{-5} S/cm. Calculate the dissociation constant of acetic acid, if molar conductivity at infinite dilution for acetic acid is 390 S cm^2/mol. (Comptt. Delhi 2013)

(2M)

Question 4.

What is the effect of adding a catalyst on

(a) Activation energy (Ea), and

(b) Gibbs energy (AG) of a reaction? (All India 2017)